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ORIGINAL ARTICLES.

THE RELATION OF CERTAIN ABNORMAL OCULAR CONDITIONS TO THE AETIOLOGY OF GENERAL NEUROSES, *e. g.*, EPILEPSY, CHOREA.

By N. M. SEMPLE, M.D.,

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The question suggested by the subject of my paper has become one of especial interest to me lately, on account of three cases, which have been under my observation for the last two and a half years. Since the essay by Stevens in 1883, which was awarded a prize by the Belgian Government, there has existed in America between certain ophthalmologists on the one hand, and on the other practically all neurologists of prominence, a controversy as to the importance of certain ocular conditions,—chief among which is what is generally called eye-strain,—in the causation of certain general neuroses, for example, epilepsy, chorea. On the side of the neurologist is also to be found probably the majority of the conservative ophthalmologists. There can be no doubt of the great importance of as exact an appreciation as possible of every factor that may enter into the causation of such dreaded diseases as epilepsy and chorea, whether it be merely a contributory, or the actual basic cause of the disease. As regards epilepsy, our present knowledge apparently leaves much yet to be scientifically demonstrated, both as to its ætiology and its pathology. In fact, of the pathology of most recognized clinical forms of epilepsy there is very little

exact knowledge. By many authorities epilepsy is considered merely a symptom-complex, at the basis of which may be demonstrated a definite pathologic condition; but, on the other hand, in many cases—as of so-called idiopathic epilepsy—no demonstrable pathologic tissue changes are to be found. In the chapter on the pathology of epilepsy in Spratling's monograph, 1904, we find summed up the present status of our knowledge of the pathology of this manifold disease. The consensus of opinion of the neuro-pathologists locates its pathology in the cerebral cortex. The gross pathological changes, as of the meninges and their bony coverings, often found in epileptics are merely contributory factors—so also the conditions resulting from trauma—and they are only of importance in so far as they produce changes in the nerve cells themselves of the cortex. Hence the ætiopathologic relation of certain conditions as infantile palsies, small cerebral hæmorrhages with hemiplegia, tumors, cysts, and vascular lesions, which often result in the clinical picture of epilepsy. As far as the microscopical changes have been demonstrated, the seat of the trouble seems to be in the cells of the second cortical layer—in other words, in the sensory cells of the cortex. The changes in the cells eventually result in a sclerosis—later often complete destruction of the cell, with a coincident glia proliferation. The theory of the causation of these cellular changes is somewhat this: Upon the nerve cells with an inherited weakness, you may say predisposition, certain influences are brought to bear, as from shock, trauma, faulty dentition, etc.—these influences affecting the cell in the performance of its normal duty of storing up and discharging nerve impulses to such an extent that the cell becomes overloaded, suddenly discharging its burden of nerve energy, which sudden discharge results in the aura of epileptic seizures, the sensory symptoms of certain areas, eventually muscular paroxysms and unconsciousness. This continued perversion of the normal function, originally of the sensory cells of the cortex, secondarily affecting the motor areas, eventually results in more or less permanent pathologic changes in the cell body, which may end in complete destruction of the cell and gliosis. In this is probably to be found an explanation of the dementia in chronic epileptics of long standing. The possible causes enumerated by the neurologists that may lead to the above changes are many—always with the chief predisposing cause of heredity in the young, and in the old, alcohol. For example, are mentioned cerebral palsies, faulty dentition—the

infectious fevers—scarlet fever, whooping cough, typhoid fever, typhus, yellow fever, grippe, malarial fever, diphtheria, measles—emotional shock, prolonged anxiety, grief, overwork, trauma, gastro-intestinal disorders, in fact, anything that might seriously affect the nervous system. Yet as regards to the influence of such a tremendous factor as eye-strain in its effect upon the function of the general nervous system, the idea of its causal importance to epilepsy is always ignored, often directly denied by the neurologists.

In accordance with the above theory of the production of the full grown pathology of the sensory cells of the cerebral cortex, why can not excessive eye-strain, with its tremendous effect on the growing nervous system of a child, be the primary underlying cause of a condition, which if allowed to continue sufficiently long, will give us the fully developed case of epilepsy with its definite pathology,—much more so than faulty dentition, gastro-intestinal disturbances, or the numerous other causes enumerated by the neurologist? As Gowers says, the original exciting cause should be considered the immediate factor in the production of the disease.

In reviewing the history of the controversy begun by Stevens in 1883 (even before this date), and carried on by the three extremists, Stevens, Ranney and Gould, one is impressed by the influence of the special hobby of each observer on his individual opinion as to the kind of ocular defect which causes the general neurosis. One cannot help but wonder if in certain instances, the sordid side of the practice of ophthalmology and neurology did not have its influence. Stevens gave the place of greatest importance to the imbalance of the extra ocular muscles, indicating numerous operations. He was so positive in his claims, that the New York Neurological Society in 1887 appointed a commission to work in conjunction with Dr. Stevens with the object of probing the latter's claims, and reporting the results to the Society. Strict articles of agreement as to the plan of procedure in this investigation regarding Dr. Stevens' methods of treatment in functional nervous diseases were drawn up between Dr. Stevens and the commission. Twenty-three cases of epilepsy and 5 cases of chorea were given Dr. Stevens for treatment, and were accepted by him. In its report, made by M. Allen Starr, as secretary, the commission claimed that there was not a single cure by Dr. Stevens' method. On the contrary, after three to twelve operations on each case on ac-

count of muscular imbalance invariably discovered by Dr. Stevens, in many of the cases the epileptic seizures were more frequent, and of greater severity after than before the treatment. Dr. Stevens in his reply claimed that he was not treated fairly by the commission, that he was given unsuitable cases, and was not allowed to follow out the treatment as he wanted. Following this report the attitude of the neurologists was, if possible, more hostile than ever towards the claims of the ophthalmologists.

Later Ranney and Gould published a number of cases, claiming absolute and permanent cures in the different forms of true epilepsy from the mildest to the grand mal type, all accomplished by an accurate correction of more or less marked refractive errors. In August, 1902, Gould requested that he be permitted to prove his claims by examination and treatment of a certain number of cases in the Craig Colony of epileptics. He selected seventy-eight cases. All showed more or less marked refraction errors. All were confirmed epileptics, some of many years standing. It is very interesting to note the widely different conclusions drawn by the different observers. Spratling, the neurologist in charge of the colony, after reviewing the results of Gould's work two years after its inception, states that, in his opinion, the correction of the refractive errors of the epileptics, not only did not lessen the progress of the disease, but on the contrary in certain instances increased the frequency of the convulsive seizures. He admits an apparent benefit in one case, but later states that the seizures had returned with the same frequency as before the beginning of the treatment. On the other hand, Gould in the report of his results, claims that the finding of refractive errors in every case examined, and the decided improvement achieved in many of the cases by correction of the errors, proved to him the causal relation of the refractive condition to the disease. He directly claims that his glasses had produced a larger percentage of cures than all the methods of treatment combined as carried on at the colony, and that the failures in many cases did not disprove his claims.

I shall not go into a detailed account of the many reports of cases of so-called epilepsy and chorea cured by glasses as found in the literature of the past ten years. Knapp doubts in the majority of instances the existence of epilepsy of the true type.

On account of the existing doubt and controversy upon the subject, I thought the two following cases might be of interest:

Mrs. H. A., referred to me by Dr. W. L. Johnson, May 12, 1904, married, age 17 years, gave a history of having suffered for some time with attacks of semi-unconsciousness, often preceded by severe headaches, nausea, and vomiting. Her husband, a man of more than ordinary intelligence, described attacks in which there were peripheral muscular spasms, yet not progressing sufficiently to produce the typical convulsions of epilepsy. This seemed to be possibly one of the *petit mal* type. The patient was of a decided neurotic temperament, as I found not a very large amount of refractive error

O.D. Ah 1. ax. vert. $V=20/15$

O.S. Hm .5 Ah .5 ax. vert. $V=20/15$

I was doubtful as to its being the cause of such a decided general disturbance. Yet after the first week following the prescribing of the glasses for constant use, the patient reported a decided improvement in the general nervous condition, and to the present time, now almost three years; has had no return of her attacks.

The other case is much more typical.

P. H. Y., referred to me also by Dr. Johnson, boy, age 10 years, of very bright, quick mental temperament, undersized physically to a marked degree; gave history of convulsive seizures, with unconsciousness, and foaming at the mouth, followed by marked lassitude lasting for hours. The attention of the general physician was directed towards the possibility of the eyes as a factor in the case, by the fact that the attacks often came on while the child was reciting in school, and attempting to see something distinctly on the blackboard. While making the strenuous effort to see accurately, he would suddenly fall to the floor, often in a severe seizure. The physical examination showed nothing pathologic except possibly the general subnormal physical development. Mentally the boy was very bright, evidently making a continuous and decided effort to see accurately and distinctly. There was no family history of epilepsy obtained. The mother was highly neurotic, known by the neighbors as "peculiar." The examination of the eyes showed a high grade of mixed astigmatism:

O.D. M2. d Ah 3. d ax. $105^\circ V=20/15$

O.S. M2. d Ah 4.5 ax. $80^\circ V=20/15$

The error was corrected by glasses, the mother instructed to interdict all night work, keeping the child out in the open air as much as possible. The case passed from under my observa-

tion, except through the general physician, from whom a few days ago I obtained the following: The child had resumed his school work, and so far had been entirely free of trouble. Physically he had developed to a marked degree, rarely complaining even of headache. The great improvement in the child is attributed by the mother to some form of worm medicine given by her about the time of the correction of the refraction, although there were no worms passed.

Her opinion is not altogether unscientific (?), as the neurological text books invariably mention intestinal worms as one of the multitudinous causes of epilepsy!

The following case is added as a type of those cases, where the functional disturbances have progressed so far that there are definite indications of organic lesions:

A. S., referred to me by Dr. Fry, boy, age 14 years, has had epileptic attacks since nine years old, attacks beginning with sensory aura in left hand, from there progressing into the typical muscular seizures. Patient often able to avert attacks by firmly gripping left hand, when the aura first begins to appear. When first seen by me, Nov. 6, 1906, patient was wearing

O.D. \mp 2.5 sph

O.S. \mp 2.5 sph \mp cyl. ax. 80°

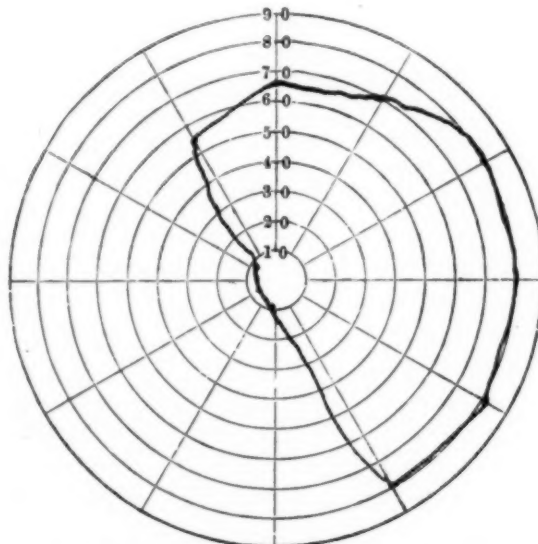
On examination his refraction was found to be the following:

O.D. Hm 3.5 V $^{20/24}$

eccentric, divergent strabismus with uncertain fixation.

O.S. Hm 3.75 Ah 0.75 ax. 75° V $^{20/18}$

The right eye gave the field as here reproduced, field O. S. normal.



Field of right eye for white with object 1 inch square.

Corresponding to the field, the ophthalmoscope showed white atrophy of temporal side of right disc with outlines sharply marked from the normal appearance of nasal side of disc. This apparently complete atrophy of the uncrossed fibres of the retina of the right eye, while the crossed fibres of left eye are perfectly normal, indicates an organic lesion of the cortex—a condition which the correction of the refraction could hardly hope to cure.

In reviewing the controversy begun by Stevens, carried on principally by Gould, it seems to me that the extreme claims of these two extremists have done a great deal to antagonize the neurologists. Yet when one considers the present knowledge of the pathology of epilepsy, and that it is considered by a majority of the neuro-pathologists as an original functional disease, which by its continuance, produces actual tissue changes, even destruction of the nerve centres, the possibility of a condition of continuous eye-strain from whatever cause, with its profound effect on the general nervous system,—I say, the possibility of such a condition being the original exciting cause of the epileptic seizures in a young and susceptible individual, seems to me, must be admitted. In old cases, as in most of the cases passed upon by the Stevens' commission, and in the 78 cases from the Craig Colony, where the disease was of long standing, it seems easy to believe that the nerve centres themselves had become sclerotic, or even destroyed. In this stage the correction of an existing refractive error might do little good, while, on the other hand, it is quite conceivable how the eye-strain caused by the existing defect may originally have been the exciting cause, and, how, if it had been corrected in time, a complete arrest of the trouble might have been effected. Such seems to be the result in the second case reported in this paper.

SUBJECTS FOR STUDY.*

MUSCLES OF THE EYE.

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Reasons for this List of Questions.—As a traveler finds numerous paths leading from the main road which he is pursuing, so in this study questions connected with the main topic have often arisen. At first they were noted with the expectation of returning to them. But it soon became evident that one life was far too short for working out all the unsolved problems relating to the ocular muscles. These questions are therefore added here in the hope that they may prove suggestive to future students. For it is unfortunately evident that much energy and professional zeal runs to waste for lack of intelligent guidance. Our ranks are recruited each year by ambitious men, well equipped for their work, and with ample time for investigation, especially in their early years of practice. As the entire field is fresh to them, they turn to whatever part is of special interest, too often making the great mistake of not ascertaining first what has been accomplished by other workers. The result is a loss to our science of valuable energy and patient labor and a disappointment to the student, when he is shown later that his "new truths" were discovered years before. As the same mistake is often made also by those of us who are old enough to know better, we find our literature full of repetitions. This is particularly so in America, and pre-eminently, it would seem, in literature relating to phases of so-called eye-strain. Therefore it may be a convenience for those who possess the desire and opportunity to study this subject further, to have suggestions as to at least a very few of the problems which yet remain to be solved. As in certain branches of manufacture the by-products become ultimately more important than the substance which first was made, so in this list of subjects for study it is hoped that the results obtained may prove much more valuable than the work which has called attention to them.

Can Kaiserling's method for preserving specimens be improved—especially in preventing the specimen from becoming hard?

*Advance proof of Dr. Howe's forthcoming Book on the Muscles of the Eye. G. P. Putnam's Sons, New York.

What stain of connective tissue can be found which is more selective than those we now have, and in colors which show better in photographs?

Measure a considerable number of globes according to the method here outlined to ascertain the average position, length, and curve of the primary insertions of the recti.

In three or four orbits inflate the globe, make moderate traction of the internal rectus, or extreme traction, harden the specimens with the globes in these different degrees of adduction, make horizontal sections, and observe the exact condition of the check ligaments.

Make series of horizontal sections showing the details of Horner's muscle.

Show the action of Horner's muscle and its exact effect on the sinking of the caruncle after tenotomy of the internal rectus.

Of what practical importance, if any, is the sound produced by the eye muscles?

What is the exact location of cells in the cortex of the brain which give rise to nerve fibers supplying the muscles?

Do the experiments of Ferrier show conclusively the existence of motor centers in the cortex?

What bands of fibers are there which pass from the cortex or other portions of the brain to the nucleus of the motor oculi?

What further evidence can we obtain by the degeneration experiments of Von Gudden to ascertain which cells in the nucleus of the motor oculi preside over certain muscles?

Demonstrate the anastomoses between the third and seventh nerves.

Demonstrate the anastomoses between the third and fifth nerves.

When operating on different members of the same family who have squinting eyes, measure accurately the position, length, and form of the arc of the primary insertion of the muscle which is divided.

How many conjugate innervations are there and what *proof* of each?

With the aid of the ophthalmophakometer, measure the size of the angle alpha and the tipping of the lens in a considerable number: A. of normal eyes. B. Of eyes in asthenopic persons.

What is the relation of astigmatism to the size of the angle alpha?

What are the points of origin and insertion of the fibers constituting the Zone of Zinn as they pass from certain parts of the

ciliary process to the anterior and posterior portions of the lens?

Does the Zone of Zinn vary greatly in different individuals?

Repeat the observations of Czellizer and Stadfelt to see whether the anterior surface of the lens becomes more convex during accommodation.

Repeat the experiments of Vœlcker and Hansen to ascertain the changes: A. In the choroid. B. In the posterior surface of the lens if any occur during the act of accommodation.

With the aid of Tscherning's ophthalmometer, observe the changes in the entopic images during the act of accommodation and give an explanation of them.

Repeat the experiments of Heine to verify his statement concerning the falling of the lens during the act of accommodation.

With the aid of the ophthalmophakometer observe the apparent astigmatic accommodation which occurs in: A. Normal eyes. B. In eyes of asthenopic persons.

With the ophthalmometer measure the form and the degree of malposition of the lens in different members of the same family who suffer from obstinate forms of asthenopia.

Observe more accurately the characteristic contraction of the pupil in different individuals.

Repeat the experiments of applying atropin and eserine to the eyes of animals, removing the eyes, freezing them immediately, and making sections to determine the form of the lens and condition of the ciliary muscles.

What difference is there in the action of a given amount of any cycloplegic or myotic upon the ciliary processes of individuals of different ages?

What curve do we obtain for the relaxation of the accommodation and dilatation of the pupil after the use of very weak solutions of duboisia, scopolamine, and of similar drugs?

What connection is there anatomically or physiologically between the posterior fibers of the occipito-frontals and the trapezius which may account for the pain which extends from the occiput over the shoulders when prolonged efforts at accommodation are made?

In any considerable number of cases what is the lifting power of the adductors?

What better method can be proposed for measuring the lifting power of the adductors?

What is the usual lifting power of the adductors in youth? In middle life? In old age?

Does the lifting power of adductors vary in proportion to the muscular development of the individual?

What is the amount of muscular force expressed in grams which is necessary to rotate an eye outward: A. In esophoria of a certain degree? B. In exophoria of a certain degree?

What is the relation between the strength of the ocular muscles and those of the body, especially as the latter is measured by Sargent's tests of strength?

Is the relation of torsion to accommodation the same as the relation of torsion to convergence?

What better explanation can we give of the mechanism of associated lateral movements than the one which we now have?

PARINAUD'S CONJUNCTIVITIS.

By J. F. SHOEMAKER, M.D.,

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Since 1889, when Parinaud first described an unusual form of conjunctivitis to which his name has been given, fewer than fifty cases of this disease have been recorded. Of these, more than four-fifths have occurred in France and the United States. The symptoms in all of them, while varying slightly in some respects, have quadrated in the main with the description given of the first cases by Parinaud, with the exception of the one statement that the enlarged preauricular glands always suppurate. This has occurred in only about thirty-three per cent. of the cases.

Parinaud described it as being different from all other inflammations of the conjunctiva, though resembling a granular conjunctivitis somewhat at first. The characteristic lesions are: swollen and edematous lids, presenting irregular nodules to the touch; red or yellowish conjunctival vegetations (which sometimes become opaque) in the fornix or on the tarsus or globe, with small superficial ulcers between the vegetations; and enlargement of the preauricular glands or some of the other glands in this region. There usually is present a slight muco-purulent discharge. The cornea is not involved and the disease is unilateral as a rule.

Verhoeff and Derby (*Arch. Oph.*, July, 1904), gave an epitome of twenty-two cases which they had been able to collect from the literature to that date, and reported a case of their own in which careful bacteriological and histological examinations

were made. Smears and cultures made from the vegetations were negative and pieces of the tissue emplaced in the eye of a rabbit as also in the groin of a guinea-pig, were absorbed with little or no reaction. Their histological findings show the disease to be quite different from trachoma, which it clinically resembles. Pus cells and "mother cells" so numerous in trachoma, are here conspicuous by their absence. They sum up their microscopic findings thus: "The lesion consists essentially of marked cell necrosis in the subconjunctival tissue with extensive infiltration of the latter with lymphoid and phagocytic epithelioid cells. This is accompanied by chronic inflammatory reaction of the deeper tissue, leading to the process of organization and the production of new fibrous tissue."

Chas. Nelson Spratt (*Arch. Oph.*, March and May, 1906), reporting a case accompanied by erythema nodosum and tonsillitis, gives the clinical histories of ten other cases that have been reported since Verhoeff and Derby's paper was published and gives a summary of the thirty-four reported cases which shows: That in but two cases were both eyes involved; the right eye was affected in 21 cases, the left in 11 cases; 18 of the cases were males and 16 females; the youngest patient was two years of age, the oldest sixty five, the majority being in young adults; 17 of the cases occurred in France, 14 in the United States, and one each in Bohemia, Canada and Porto Rico; 8 of the cases occurred in October, 7 in November, 4 in September, 3 in July, 3 in May, 2 each in January, December and June, 1 each in April and February and 1 case not stated; the shortest case lasted two and one-half weeks, the longest ten months, the average time being five to eight weeks; and suppuration of the glands occurred in twelve cases, which trouble lasted some time after the eye had recovered.

Karl Hoor (*Klin. Mon. fuer Augenh.*, 1906, xlv, P. 289, Abstracted in *Ophthalmology*, Oct. 1906), gives a complete review of the literature of this disease with historical dates and short abstracts of the cases published. He succeeded in collecting forty-three cases from literature and reports the forty-fourth, in a cowherd. He found that in 65 per cent. of the cases the possibility of infection through animals existed while in 35 per cent. it did not. While Parinaud believed the disease to be due to some infectious agent transferred from animals to man, sufficient proof to establish this theory is wanting and as yet the etiology of the disease is unknown.

The following case, while it presents no facts relative to the cause or pathology of the disease, may be of some interest, as to the treatment, and adds another to the growing number of cases:

E. P., aged 11 years, presented himself for treatment Oct. 12th, giving a history as follows: Two weeks ago the left eye became slightly inflamed. Several days later it began hurting some and there was some secretion. About one week after the beginning of the trouble the lids and that side of the face began to swell. This swelling increased gradually until he presented himself for treatment. Father, mother and six brothers and sisters are all well, as is he, himself, with the exception of this trouble. He has been around no animals excepting a pet cat, with which he plays a great deal. On examination there was found marked swelling of the lids of the left eye, especially the upper one, and the whole of the left side of the face. There was considerable ptosis due to the edema of the upper lid. The conjunctiva was injected and there was some chemosis, particularly on the temporal side of the globe. On everting the upper lid there were found large polypoid vegetations of the conjunctiva over the tarsus and in the fornix, which resembled very much certain forms of trachoma, only they were very marked on the outer half of the upper tarsus while there were few on the inner half and none on the lower lid. Between the granulations there were three white spots about the size of a pin head which proved to be superficial ulcers of the conjunctiva. The conjunctiva of the lower lid was inflamed, but there were no vegetations present. There was a slight marginal keratitis. The parotid, preauricular and submaxillary glands were enlarged and painful to the touch. The right eye and the glands on the right side of the face were normal. A culture made from the secretion showed the xerosis and subtilis bacilli present. A one-fifth of one per cent. solution of silver nitrate was used and he was given a solution of boric acid to use at home. During the next few days this treatment was continued. The lids became more edematous and the granulations more prominent and extended further toward the nasal side of the upper tarsus, so that the whole upper lid became involved. The glands became more swollen and painful to the touch. The skin over that side of the face became tense and shining. He did not complain of the eye paining but the face became very painful, so that he could not sleep and mastication caused him to suffer considerably. Said he felt sick.

As he was getting worse under the treatment given, and fearing suppuration of the parotid gland, on October 21st I began applying a one per cent. solution of silver nitrate to the granulations on the upper lid with a cotton wrapped probe and covered the swollen glands with antithermoline, keeping it applied over night but removing it during the day. This afforded him great relief from the first and he was able to sleep. By October 24th the skin was much less tense and the shining appearance had disappeared. The swelling of the glands was subsiding and there was very little sensitiveness to the touch and no pain. The granulations were rapidly disappearing. At this time he was feeling so well that he failed to return for more than a week. A note sent to his parents brought him back on November 6th when I found the eye normal except for a slight conjunctivitis of the upper lid. The vegetations had entirely disappeared. The swelling had subsided from all of the glands except the parotid, and that was very slightly swollen and there was no tenderness to the touch. Two weeks later all symptoms of the disease had entirely disappeared.

The treatment recommended for this disease has varied from the use of mild cleansing solutions to the excision of the polypoid growths. The latter has recently been strongly advised by several writers on the subject. In view of the rapid disappearance of these granulations under the topical applications of a one per cent. solution of silver nitrate in this case, it would appear that, while it is desirable to excise them for histological purposes, to do so as a matter of routine treatment is entirely unnecessary.

IRIDO-DIALYSIS FROM BLOW BY A BB SHOT— RE-ATTACHMENT.

By J. W. CHARLES, M.D.,

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On February 3rd, 1906, H. S. H., Jr., 13 years old, was brought to me with the following history: Two hours before his left eye had been struck by a BB shot discharged from an air-gun at a distance of one or two feet,—the boy held the gun with its butt on the ground and he was looking down when it was discharged.

Status Praesens: Slight wound of the upper lid-margin. Abrasion of the conjunctiva and of the cornea-scleral limbus above. No perforation of the globe. Irido-dialysis above and in-

ward. Considerable amount of blood at the bottom of the aqueous with strands of blood-clot extending from the wound in the iris to the hyphæma. The tear in the iris is ragged and the pigment layer of the latter is turned forward into the anterior chamber. The appearance is that shown in Fig. 1.—

O.D. V=10/10.

O.S. V=10/120.



Figure 1. Appearance of the eye 2 hours after injury, February 3d.

I could obtain no view of the fundus.

The injured eye was irrigated with a solution of bichloride of mercury 1-5000 and a solution of atropia gr. lv—, and cocaine gr. xvi to $\frac{3}{4}$ i was instilled. Collodion dressing.

On the following day the patient reported that he had experienced no pain although he was nervous all night, sleeping very little. O.S. V-19/120. No view of the fundus could be obtained, but the hyphæma had almost entirely disappeared. The conjunctiva was only slightly injected, there was no circumcorneal injection. R Hydrarg. Chlor. Mit. gr. 1/10 t.i.d. Perfect quiet was enjoined.

February 5th.—The patient suffered severe pain in the injured eye for a short time last night after the excitement of having sympathizing company. Treatment with the mydriatics and collodion dressing. The importance of keeping the patient perfectly quiet was accented.

6th.—Great pain last night following straining at stool. Inspection gives a fresh hæmorrhage filling the anterior chamber so thoroughly as to completely hide the iris and pupil. The con-

conjunctiva is œdematous above, and at the site of the bruise is a round swelling of scleral or episcleral tissue, 3mm in diameter, which is very tender. The conjunctiva is very much congested, with, however, only slight ciliary injection. V-- Light perception. The patient was sent to St. Luke's Hospital, where he was put to bed and the eye protected from injury by a cataract mask. His family physician, Dr. Willis Hall, prescribed bromide of sodium and he also received Hydrarg. Chlor. Corros. gr. 1/24 t. i. d.—Milk diet. Within twenty-four hours the inflammation was much diminished, the patient suffered no more pain and the appearance of the eye began to improve from the day of entering the hospital.

March 5th.—

O.D. V= $\frac{18}{19}$

O.S. V= $\frac{19}{38}$.

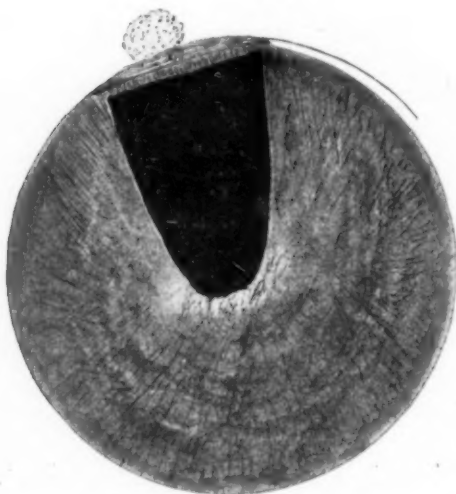


Figure 2. Condition March 5th.

The ophthalmoscope gives O. S. shreds of membrane hanging in the aqueous from the region of the bruise, and waving with the movements of the eye. The base of the iris is reattached and is covered with blood-pigment as in Fig. 2. Above the band of reattachment is a round slightly discolored area in the sclera, 3mm in diameter, extending over the corneal limbus. It is evidently scar tissue in the episclera or superficial layers of the sclera, but it shows no tendency to bulge nor has it the thinned-out appearance which follows scleritis. The ophthal-

moscope gives a distinct disturbance of the retinal pigment upward and outward from the disc.

March 24th.—O. S. V-19/24, not improved by any glass. The eye is free from irritation. The point of reattachment has shrunk to a narrow band, the pupil being displaced upward and inward,—rather paraboloid in shape. Later, the band of reattachment contracted also laterly and the pupil became more elliptical. Its diameter is now 4mm+; its length 6mm—; the diameter of the cornea is 12mm. The lower pupillary margin is also slightly higher than normal. The ciliary processes cannot be seen. (This point has been mentioned as of diagnostic importance in cases of suspected retroversion of the iris).



Figure 3. Condition May 5th.

In spite of the fact that competent observers have repeatedly seen the wound in the iris gape under the use of the mydriatics through narrowing of the bridge of tissue between the two pupils (by contraction of the dilatator), I felt sure that the tear was so large that there was no hope of closing it and the solution of atropia and cocain was therefore used in order to allay the inflammation which was fully expected.

An examination of the literature, however, shows two cases of marked similarity to this: Moorehead (*British Medical Journal*, Ref. Michel's *Jahresbericht*, 1876) reported a case of irido-dialysis involving 1-6 of the iris-periphery outward and below following contusion. There was no hæmorrhage. Treatment immediately after the injury with atropine and pressure bandage. Two hours later, the pupil was dilated ad maximum

and the dialysis almost invisible. Eight days afterward more than three-quarters of the rent had healed "per primam", only the lower edge remaining open. He referred the reattachment to the early atropinization and "the immediate approximation of the wound-edges."

Werner-Ophthalmic Review, 1887, Pg. 103—obtained union after a little less than one-third of the periphery had been torn loose at the outer side. The media were perfectly clear for four days. The patient then experienced severe pain in the eye, and the anterior chamber was found to be filled with blood. In two weeks, the blood had disappeared and the iris was perfectly reattached, the pupil contracting readily. Werner used atropine and the pressure bandage.

In two of these three cases, the atropia seemed to have no effect whatever on the approximation of the wound margins for several days, when a hæmorrhage with its irritative accompaniments occurred: one can imagine that a hæmorrhage might float the iris up by its very viscosity, or that a blood-clot advancing from the bottom of the anterior chamber might force it into its normal position and that the products of inflammation might then bind it in situ.

While theoretical discussions concerning the effect of the direction of violence to the eye might seem to be fruitless, the greater mass of the cases seems to point to the conclusion that:

1. Peripheral lesions are usually caused by direct action of the force upon the ciliary attachment of the iris, and the direction of the force must have an effect in modifying its violence; but

2. When violence is applied elsewhere than at the corneal periphery, one must remember that the law of hydrostatics (that a force acting on a fluid is equally active upon every point of the walls of the space in which the fluid is contained) makes it comparatively irrelevant from what direction it may come because the pressure upon the iris is equally distributed. We can then consider two fixed points: First, its attachment to the ligamentum pectinatum peripherally and, secondly, the close application of the sphincter-zone to the lens-capsule, necessarily increased under the pressure of the force, made possible by a contracted pupil, preventing its yielding before the blow. Therefore theoretically a blow applied to the center of the cornea would be most likely to cause a radial rupture first of the sphincter-zone by crushing it against the lens-capsule (perhaps at the same time forming a slight protection to the capsule) and then to the middle zone of loose stroma and vessels.

The reasons for the more extensive hæmorrhage in irido-dialysis than in iridectomy were enumerated by H. Schaefer in von Graefe's Archives, 1883. He was convinced—

1. That it was the immediate result of a "neuromparalytic" condition of the blood-vessels with dilatation, caused by the great violence of the injury, while cutting with scissors stimulated the vessel-wall to constriction and therefore prevented hæmorrhage.

2. The site of injury in irido-dialysis is more favorable to hæmorrhage on account of the larger size of the vessels at the base of the iris, than at the site of an iridectomy. He also called attention to the fact that

3. The vessels of the iris rest in a loose connective tissue. They possess a powerful adventitia and muscular coat and are supplied with an unusual number of nerve twigs. Cut vessel-walls come together in the iris much more readily than torn ones which gape in the loose iris-stroma.

A STUDY OF THE NATIVITY, SEX AND AGE, OCCUPATION AND SOCIAL CONDITION OF THREE THOUSAND FOUR HUNDRED AND THIRTY-SIX CASES OF SENILE CATARACT OPERATED ON AT THE WILLS' EYE HOSPITAL IN PHILADELPHIA.

Chas. A. Oliver, A. M. M. D. (New York Med. Journal, Nov. 10), from a thorough study of three thousand four hundred and thirty-six cases of uncomplicated mature senile cataract operated on by the attending staff of Wills' Hospital, in Philadelphia, during the past thirty-five years, gets the following results:

- (1) *Nativity*: As might be expected from the generally known and historically well understood several great influxes of foreign national element (particularly the Welsh, the English, the German, the Irish, the Italian, the Austrian and the Russian in the order here given) into this part of the United States of America, nativity has exerted a marked influence upon the obtained results. To such a degree has this affected the entire question, that it has been found necessary to separate all of the cases into two great groupings, the foreign and the native born, each of which has been subdivided into country and state.

Primarily, and based upon sufficiently broad evidences in every class that has been used, it has been found that there were fifteen

hundred and thirty-five foreign born cases, and nineteen hundred and one native born ones, a rough ratio of three (+) cases to four (—) cases. Of the foreign born groupings, Ireland furnished the greatest number throughout the three and a half decades; actually rising to some 55 per cent. This was closely followed by Germany with thirty and some per cent., England with 10 per cent. and Wales and Scotland with 3 and 2 per cent. respectively.

Among the native born, Pennsylvania, with its preponderant 65 per cent., naturally gave a long lead; followed by 15 per cent. for New Jersey; 10 per cent. for Delaware, and 5 per cent. each for Maryland and New York. Many stray cases from the New England, the Southern, and the Western States—distributed particularly throughout the third and the last half decades, are to be found; but like those of the foreign lists, they have been excluded from the tables by reason of comparative fewness of numbers.

(2) *Sex and Age*: In general, it was found that during the decades from 1871 to 1880 inclusive, the average age of operation for men was 62.2 years; during the decade from 1881 to 1890 inclusive, it had slightly increased (63.3 years); during that from 1890 to 1900 inclusive, it had again risen slightly—to 63.7 years; while during the last five years, 1901 to 1905 inclusive, it had reached the high average of sixty-six years; thus giving a rough general average of about sixty-three years for the thirty-five years' time.

Among women, the general average age, while equal to that for men, (about sixty-three years), showed an increase, which, while not so great, was certain: That for the first decade being 62.5 years; that for the second decade 63.9 years; that for the third decade 63.5 years (a slight fall); and that for the last five years having risen to 63.8 years.

With the native born male American, there existed the highest average age for operation, and hence most probable that of maturity of his cataract. During the first decade, it was 64.5 years, increasing one-tenth to 64.6 years for the second decade, and rising another tenth (64.7 years) in the third decade—until in the first half of the last decade, (to date,) it has arisen to the remarkable average of 67.6 years. The Irish male, commencing at 61.7 years, falling two-tenths (61.5 years) in the second decade, and rising four-tenths (61.9 years) in the third, showed a final increase of six-tenths (62.5 years) in the last half decade.

The male German beginning lower at 60.6 years, gave a rise to 60.9 years in the second decade, with a sudden jump to 64 years in the third—to which he finally added eight-tenths of a year, (64.8 years). The Englishman and the Scotchman at 60 years and 50 years each, rose to 63.5 years and 60 years, with a rise of the former to 65.3 years, and a fall of the latter to 58 years—to at last give the phenomenal jumps to 70 years and 71 years respectively.

Among seven hundred and thirty native born women, forming about 50 per cent, of the total of fourteen hundred and fifty-two female cases in the series, it was found that the average operation age during the first decade was 63.1 years, increasing in the second decade to 65.4 years, and decreasing in the third decade to 64.3 years; ultimately rising in the last five years, to 63.8 years: Thus giving an increase of seven-tenths of a year as the general average. The Irish female ratio increased regularly through the four decades from 60 years, to 60.8 years, to 62.1 years, and to 63.2 years as the final average, a very marked gain in the proportion. The German female, commencing with 62 years, fell to 60.8 years in the second decade, to rise 63.9 years in the third, and to give an enormous leap to 68.5 years as the average for the last half decade; a most remarkable betterment. The English woman and the Scotch woman, commencing at 62 years and 64 years respectively, suddenly rose to 64 years and 73 years each, to again fall very low, 62 years and 60 years each, but ultimately to reach 63.2 years as the final for the former, with a remarkable jump to 73 years as the final for the latter. All the representatives of the other nations, among whom there was sufficient material for proper averaging, showed a decided betterment in the ratios that were obtained.

(3) *Occupation*: It was soon realized that as occupation among the male subjects played such an important part in regard to the maturity, and even causation of the cataractous condition, it was necessary to divide the patients' vocations into four classes; (a), the unskilled laborer with his comparatively unused for near work eyes; (b), the skilled workman, whose eyes are incessantly exposed to bright glares of light and high temperatures of heat; (c), the high grade artisan, who requires accurate eyesight for proper manipulative procedures; and (d), the brain worker, whose entire time is sedentarily occupied with efforts at close vision.

The first great class, (a), composed principally of out of door laborers, such as boatmen, drivers, farmers, hostlers, miners,

porters, stevedores, and watchmen, although by far the greatest in number, gave the highest operative age average, sixty-six years throughout the entire three and a half decades; the average practically remaining the same.

The second class, (b), made up of blacksmiths, glass blowers, puddlers, and other workers in superheated materials, gave by far, the lowest age for the operative procedure, fifty-eight years.

The third class, (c), composed of those in such employments as book binders, compositors, edge-tool makers, engravers, jewelers, shoemakers (particularly), and tailors, showed the lenticular condition fit for removal at an average age of sixty-three years.

The fourth class, (d), made up of those in vocations such as agents, clerks, and professional men, most probably, by reason of better hygiene, etc., gave a very high operative age, sixty-five years, as the average.

In regard to the women, there were but few active ones who were registered otherwise than housekeepers; this no doubt was owing to the fact of the limitation of means of livelihood for women which was existent at the time of the early life of the subjects in question: The average operative age for the women, without regard to nationality, was, as has been elsewhere alluded to, about sixty-three years; this time ratio being somewhat earlier among the foreign born cases.

(4) *Social Conditions*: Commencing with foreign born married men as the highest at about 33 per cent. of the nineteen hundred and eighty-four males, (with a slight difference in favor of the native born) (31 per cent.), the foreign born widowers fell to 12 per cent. and the native born widowers to 13 per cent. Of the single men, 6 per cent. were natives, and 5 per cent. were foreigners. The women, on the contrary, gave their greatest showing of 27 per cent. for native born widows, and 24 per cent. for native married women; with 22 per cent. for foreign born widows, and 9 per cent. for foreign born married women. The ratio for single women, though the same in favor of the foreign born, gave the degree of per cent. lower—respectively five and three.

As might be expected from the ordinary course of things, some 65 per cent. of the male cases were married, 30 per cent. had been married and the few remaining 5 per cent were single. Fifty per cent. of the female cases were widows, 40 per cent. were married, and 10 per cent. were single. These results, as is well known in other similar statistical work, showed a slight disproportion in favor of the married male and the widowed female.

SCROFULA AND PHLYCTENULAR DISEASE.

G. F. Rochat, (*The Ophthalmoscope*, May) reviewing an article on "Scrofulosis and dormant tuberculosis," by W. Straub, gives the views of several investigators and writers on the bacteriology of phlyctenular disease and its relation to tuberculosis.

While some of the early investigators concluded that phlyctenular conjunctivitis was caused by staphylococci, others, among them, Axenfeld, held that it might be produced by any infection of the conjunctiva in a scrofulous person; that it was the peculiar reaction of the conjunctiva of the scrofulous person to different kinds of infection. Straub agrees with Axenfeld that two factors enter into its causation, viz.: the scrofulous diathesis and an infection of the conjunctiva, but disagrees with him concerning any kind of an infection causing it. He believes that the staphylococci play an important part in the production of this condition. The fact that the eruptions are mostly superficial and situated at the limbus, where infected matter in the groove surrounding the cornea escapes the action of the tears and lids which remove such material from other parts of the eyeball points toward an infection from without, as does also the rapid success of external treatment, at times. Numerous researches to determine the part played by the staphylococci were made under Straub's supervision.

Meyers found staphylococci almost constant in the conjunctiva, mouth, nose, and in facial eczema.

v. Haaften found staphylococci to be more frequent in scrofulous conjunctivae than in healthy eyes, or in eyes inflamed from other causes and hence attributes a certain importance to these germs in the aetiology of phlyctenular conjunctivitis.

Supporting the theory that a previous infection with the tubercle bacilli causes a pre-disposition to phlyctenular conjunctivitis, is the fact that in many cases a tuberculous infection is readily found in some part of the system; and Straub believes that in many cases where it cannot be readily found, it exists in the bronchial glands, as tuberculosis of these glands is very frequent, especially in scrofulous children.

v. Haaften, in Straub's laboratory, infected with staphylococci the corneas of rabbits previously inoculated with tuberculosis, and the infection was much more severe than in other rabbits' eyes infected in the same way at the same time, but not inoculated with tuberculosis. This experiment is an argument in favor of Straub's theory.

CORRESPONDENCE.

NEW YORK STATE COMMISSION TO INVESTIGATE
THE CONDITION OF THE BLIND OFFICE
AT BATAVIA, N. Y.

BATAVIA, N. Y., December 15, 1906.

MY DEAR SIR:—

The loss of sight in the case of an individual is of economic importance to the state. The New York State Commission to Investigate the Condition of the Blind has been charged, therefore, by the Legislature with the duty of inquiring into the causes of blindness, and of recommending methods by which, as far as possible, unnecessary blindness may be prevented. To that end the Commission begs the assistance and advice of the medical profession. The secretary will gratefully receive and acknowledge any reprints, reports, pamphlets—or personal communications bearing on the causes and prevention of blindness.

More especially information is sought on the following points:
CONGENITAL BLINDNESS:

Its causes, the influence of heredity, consanguinity, etc.
The reports of cases of blind parents producing blind children, character of blindness in such cases, etc.

OPHTHALMIA NEONATORUM:

How generally are preventive measures employed?
Statistics bearing on the subject.
What silver salt and in what strength should be recommended?

TRACHOMA AND OTHER INFECTIOUS EYE DISEASES:

Statistics.
How may early treatment be secured?
Prevalence in schools, orphan asylums, etc.
Preventive measures—medical inspection of schools.

BLINDNESS FROM ACCIDENT, INJURIES, FIREWORKS, TOY-PISTOLS,
ETC.:

Statistics.
Method of protection for eyes of workmen, and others.
Prohibition of dangerous explosives at celebrations.

TOXIC AMBLYOPIA:

From methyl alcohol—other toxic agents. How may the public be protected?

NEGLECT ON THE PART OF PARENTS VISITING DISPENSARIES:

Patients suffering from conditions threatening vision absent themselves from clinics after being advised of the need of immediate treatment until too late. Method of reaching such.

BLINDNESS DUE TO NEGLECT OF SLIGHT OPHTHALMIC INJURIES:

How can early treatment be more generally secured?

BLINDNESS DUE TO IMPROPER HYGIENE AND SANITATION IN

CORNEAL TROUBLES OF CHILDREN:

How can early treatment be secured?

OTHER CAUSES OF BLINDNESS:

Suggestions as to prevention.

The Commission will be most grateful for advice and assistance on the above subjects.

Very respectfully yours,

F. PARK LEWIS, *President*,
454 Franklin St., Buffalo.

O. H. BURRITT, *Secretary*,
Batavia.

BILATERAL REMOVAL OF THE LENS FOR HIGH MYOPIA; THE SUBSEQUENT USE OF DIONIN.

Howard F. Hansell (American Medicine, Oct. 1906) reports the case of a young man, aged 18, average height and weight, and apparently healthy, who had 21 D. myopia in the right eye and 23 D. in the left. Vision with full correction = $\frac{20}{100}$ R. and $\frac{20}{70}$ L. The ophthalmoscope revealed marked changes in the fovea and a large posterior staphyloma in the right eye. According to the patient's statement he had not used the right eye for two years, during which time he had one or two small hemorrhages. There was a small extravasation of blood in the fovea of the left eye at the time of examination. His vision had been slowly retrograding during the past five years. He used his eyes for writing and reading during the greater part of the day in his business, that of a clerk. The blood in the left fovea was slowly absorbed under the use of potassium iodid, but during the spring he had two more minute hemorrhages in this fovea. Under vigorous treatment the vision improved for a time, but further hemorrhages recurred, aggregating fifteen in number, always in the left fovea, until there was a disorganized patch the size of the optic disc. After nine months the author needled the right

lens superficially and again six days later. Seven days after this the lens mass was extracted through a corneal incision and the capsule needled two weeks later. Seven weeks after the first needling, all signs of traumatism having subsided and vision in the right eye being such that he could travel the streets safely, the left lens was treated similarly, except that the capsule of the left lens was not needled but was completely absorbed by dionin, excepting a few tags at the periphery. His vision at present = R. $\frac{20}{70}$ w. + 1. D. cyl. ax. 135° ; L. $\frac{20}{50}$ w. + 1. D. S. \bigcirc w. + 3. D. cyl. ax. 135° and with + 3. D. S. added he reads Shellen .50 D. at 12 in. with either eye. Were it not for the disturbances in the fovea his vision would reach full acuity, as the pupillary areas in both eyes are entirely clear.

He calls attention to the success following his treatment which had been contrary to most of the rules laid down for the surgical management of high myopia; known "hemorrhagic tendency, choroidal degeneration and lesions in the macular region" being among the contraindications to operate, which are generally accepted. Hansell gives as his own view "that myopia of 15 D. or over, known to be progressing in spite of careful refraction, *independent of the common fundus changes*, is suitable for operation because (1) progressive myopia invariably leads to atrophy of the choroid and degeneration of the retina at the posterior pole of the eye; (2) the effort to see clearly in the distance or near, by reason of the diminished images seen through strong glasses and the necessity for strong light, induces severe and constant strain that in itself tends to increase the myopia; (3) the highly myopic individual is debarred from many occupations; (4) removal of the lens, by curing the myopia, checks the further degeneration of the fundus." Detachment of the retina is probably not any more liable to occur after the operation than in cases of high myopia without operation. "The loss of accommodation is of little import as the circular fibres of the ciliary muscle have little power in high malignant myopia. The dangers are those incident to operation on the interior of the eyeball, namely infection, hemorrhage, loss of vitreous, incarceration of the iris or capsule, iritis and glaucoma. They may, with the exception of glaucoma, be avoided by careful preparation, thorough asepsis and skilful technic." Should glaucoma follow the escape of lens matter into the anterior chamber, it can be speedily relieved by removing the lens mass through a corneal incision. The accepted methods of operating are: (1) Extraction as performed for senile cataract. (2) Direct linear extraction. (3) Repeated discission. (4) Discission and linear extraction. The last method appeals to the author as the safest and the most rapid. In concluding he recommends the use of dionin following operations on the lens, as he has in several cases seen it cause the debris to be absorbed quite promptly, leaving a clear pupillary area. He begins with 2 per cent., increasing it to 5 per cent. and finally to 10 per cent.

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